

CLAIMS

1. A plastic article comprising:
at least one of an ESD layer and EMI-shielding layer having a
polymer matrix and stainless steel fibers obtained by the bundled
drawing of stainless steel wires wherein said stainless steel fibers
having an equivalent diameter being more than 0.5 μ m, said
equivalent diameter being less than 100 μ m, said stainless steel
fibers having a composition comprising iron and the following
components expressed in percent by weight :
 $C \leq 0.05 \%$,
 $Mn \leq 5\%$,
 $Si \leq 2 \%$,
 $8 \leq Ni \leq 12 \%$,
 $15 \% \leq Cr \leq 20 \%$,
 $Mo \leq 3 \%$,
 $Cu \leq 4 \%$,
 $N \leq 0.05 \%$,
 $S \leq 0.03 \%$,
 $P \leq 0.05 \%$.
2. A plastic article according to claim 1, whereby said composition
satisfies the following relationship :
 $MI = 551 - 462 \times (C \% + N \%) - 9.2 \times Si \% - 20 \times Mn \% - 13.7 \times Cr$
 $\% - 29 \times (Ni \% + Cu \%) - 18.5 \times Mo \%$, said $MI \leq -40$.
3. A plastic article according to claim 2, said $MI \leq -55$.
4. A plastic article according to claim 1, wherein the volume of said
stainless steel fibers is more than or equal to 0.1%volume of said
plastic article.

5. A plastic article according to claim 1, wherein the volume of said stainless steel fibers is less than or equal to 5 vol% of said plastic article.
- 5 6. A plastic article according to claim 5, wherein the volume of said stainless steel fibers is less than or equal to 2.5 vol% of said plastic article.
- 10 7. A plastic article according to claim 6, wherein the volume of said stainless steel fibers is less than or equal to 1.5 vol% of said plastic article.
- 15 8. A plastic article according to claim 7, wherein the volume of said stainless steel fibers is less than or equal to 1 vol% of said plastic article.
- 20 9. A plastic article according to claim 1, wherein said plastic article has a thickness T, said T being less than or equal to 5 mm.
- 20 10. A plastic article according to claim 9, wherein T is less than or equal to 3 mm.
- 25 11. A plastic article according to claim 10, wherein T is less than or equal to 1 mm.
- 25 12. A plastic article according to claim 1, wherein said polymer matrix is a thermo-set polymer.
- 30 13. A plastic article according to claim 1, wherein said polymer matrix is a thermoplastic polymer.
- 30 14. A plastic article according to claim 1, wherein said polymer matrix is chosen out of the group consisting of polyethylene (PE), polypropylene (PP), polystyrene (PS), polyethylene terephthalate

5 (PET), polyethylene naphthalate (PEN), polybutene terephthalate (PBT) polyvinylchloride (PVC), polyamide (PA) , polyester (PES), polyimide (PI), polycarbonate (PC) , styrene acrylonitril (SAN), acrylonitril-butadiene-styrene (ABS), thermoplastic polyurethane (TPU), thermoplastic polyolefins (TPO), thermoplastic
copolyetheresters, copolymers of these polymers or a mixture of these polymers.

10 15. A plastic article according to claim 1, wherein said plastic article has a shielding effectiveness of more than 5 dB.

16. A plastic article according to claim 1, wherein said plastic article has a shielding effectiveness of more than 20 dB.

15 17. A plastic article according to claim 1, wherein said plastic article has a shielding effectiveness of more than 30 dB.

18. A plastic article according to claim 7, wherein said plastic article has a shielding effectiveness of more than 5 dB.

20 19. A plastic article according to claim 7, wherein said plastic article has a shielding effectiveness of more than 20 dB.

25 20. A plastic article according to claim 7, wherein said plastic article has a shielding effectiveness of more than 30 dB.

21. A plastic article according to claim 10, wherein said plastic article has a shielding effectiveness of more than 5 dB.

30 22. A plastic article according to claim 10, wherein said plastic article has a shielding effectiveness of more than 20 dB.

23. A plastic article according to claim 10, wherein said plastic article has a shielding effectiveness of more than 30 dB.

- 5 24. A plastic article according to claim 1, said stainless steel fibers having a fracture strength, said fracture strength having a standard deviation of less than 180MPa.
25. A plastic article according to claim 1, said stainless steel fibers having a strain at fracture, said strain at fracture having a standard deviation of less than 0.15%.
- 10 26. A plastic article according to claim 25, said fracture strength being more than 2000MPa.
27. A plastic article according to claim 25, said strain at fracture being more than 1%.
- 15 28. A plastic article according to claim 1, whereby the diffusion of the individual elements of the matrix material, used on said stainless steel wires during said bundled drawing, is limited to less than 1 at % at a depth of 100 nm below the surface of said stainless steel fibers.
- 20 29. A plastic article according to claim 28, whereby said matrix material comprises a metal or a metal alloy.
- 25 30. A plastic article according to claim 29, whereby said metal or metal alloy comprises copper, iron or a copper or iron alloy.
- 30 31. A thread comprising an impregnating resin and stainless steel fibers obtained by the bundled drawing of stainless steel wires wherein said stainless steel fibers having an equivalent diameter being more than 0.5 μ m, said equivalent diameter being less than 100 μ m, said stainless steel fibers having a composition comprising iron and the following components expressed in percent by weight :
- $C \leq 0.05 \%$,

Mn \leq 5%,
Si \leq 2 %,
8 \leq Ni \leq 12 %,
15 % \leq Cr \leq 20 %,
Mo \leq 3 %,
Cu \leq 4 %,
N \leq 0.05 %,
S \leq 0.03 %,
P \leq 0.05 %.

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32. A thread according to claim 31, whereby said composition satisfies the following relationship :

$$MI = 551 - 462 \times (C \% + N \%) - 9.2 \times Si \% - 20 \times Mn \% - 13.7 \times Cr \% - 29 \times (Ni \% + Cu \%) - 18.5 \times Mo \%, \text{ said } MI \leq -40.$$

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33. A thread according to claim 32, said MI \leq -55.

34. A thread according to claim 31, wherein said impregnating resin provides between 1 %vol and 99 %vol of said tread.

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35. A thread according to claim 31, wherein said impregnating resin is polyvinylalcohol (PVA), polyethylene (PE), polypropylene (PP), polystyrene (PS), polyvinylchloride (PVC), polyester (PES), polyacrylate, polymethacrylate or a copolymer of these polymers.

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36. A grain comprising an impregnating resin and stainless steel fibers obtained by the bundled drawing of stainless steel wires wherein said stainless steel fibers having an equivalent diameter being more than 0.5 μ m, said equivalent diameter being less than 100 μ m, said stainless steel fibers having a composition comprising iron and the following components expressed in percent by weight :

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C \leq 0.05 %,
Mn \leq 5%,

$\text{Si} \leq 2 \%$,
 $8 \leq \text{Ni} \leq 12 \%$,
 $15 \% \leq \text{Cr} \leq 20 \%$,
 $\text{Mo} \leq 3 \%$,
 $\text{Cu} \leq 4 \%$,
 $\text{N} \leq 0.05 \%$,
 $\text{S} \leq 0.03 \%$,
 $\text{P} \leq 0.05 \%$.

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10 37. A grain according to claim 36, whereby said composition satisfies the following relationship :

$$\text{MI} = 551 - 462 \times (\text{C} \% + \text{N} \%) - 9.2 \times \text{Si} \% - 20 \times \text{Mn} \% - 13.7 \times \text{Cr} \% - 29 \times (\text{Ni} \% + \text{Cu} \%) - 18.5 \times \text{Mo} \%, \text{ said MI} \leq -40.$$

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38. A grain according to claim 37, said $\text{MI} \leq -55$.

39. A grain according to claim 36, wherein said impregnating resin provides between 1 %vol and 99 %vol of said tread.

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40. A grain according to claim 36, wherein said grain having a length ranging between 0.5 mm and 12 mm.

41. A grain according to claim 36, wherein said grain having a length ranging between 3 mm and 6 mm.

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42. A grain according to claim 36, wherein said impregnating resin is polyvinylalcohol (PVA), polyethylene (PE), polypropylene (PP), polystyrene (PS), polyvinylchloride (PVC), polyester (PES), polyacrylate, polymethacrylate or a copolymer of these polymers.

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